



# TEAM\_Play for Europe

(Tool Suite for Environmental and Economic Aviation  
Modelling for Policy Analysis)

## ANERS

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### Project Products, Results and Outlook

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# Content

- **Goal and achievements of the TEAM\_Play project:** Establishing a European modelling capability, providing powerful tools for the performance of adequate policy assessment studies within ICAO-CAEP and on European, national and local levels.
  - Introduction
  - Main “products”
  - Main results
- **How should Europe go ahead with TEAM\_Play**, alongside Clean Sky and SESAR, to fully benefit from the tool suite capabilities in assessing trends and policies on the technological, operational and regulatory/economic levels?



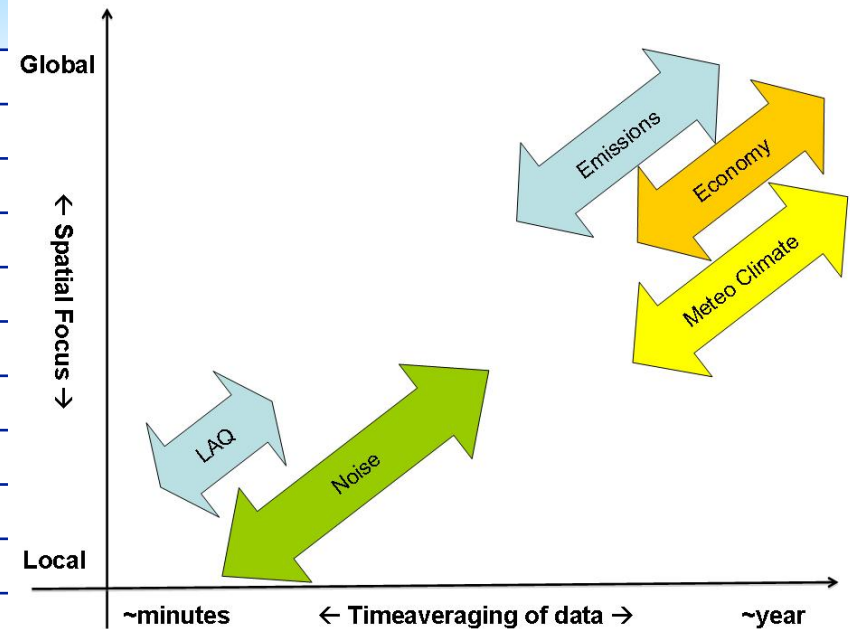
# Project background and objective

## Background:

Wide range of aviation-related policy assessment modelling capabilities in Europe, like noise emissions, LAQ, climate impact and economic assessment tools.

# TEAM\_Play – Tools

Model	Custodian	Domain
ADMS-Airport	CERC	Emission / AQ (local)
ALAQs 2.0	EUROCONTROL	Emission / AQ (local)
LASPORT	Janicke Consulting	Emission / AQ (local)
POLEMICA	NAU	Emission / AQ (local)
3PR	NAU	Third Party Risk
AEM	EUROCONTROL	Emissions (Global)
FAST	MMU	Emission (Global)
AERO-MS	EASA	Traffic, Emissions (Global)
AERO2k	Ricardo-AEA	Emissions (Global)
STAPES	EUROCONTROL	Noise
SONDEO	Anotec Consulting	Noise
IsoBella 2.0	NAU	Noise
AirClim	DLR	Meteo-Climate
LinClim	MMU	Meteo-Climate
MeteoServer	EUROCONTROL	Meteo-Climate
Macro-Economic Impact	DLR	Economic
Energy Module	DLR	Economic
Monetisation Impact Tool	DLR	Economic



- Multitude of different tools on different domain areas
- Tools show differences in scope, spatial and time-scales



# Project background and objective

## Background:

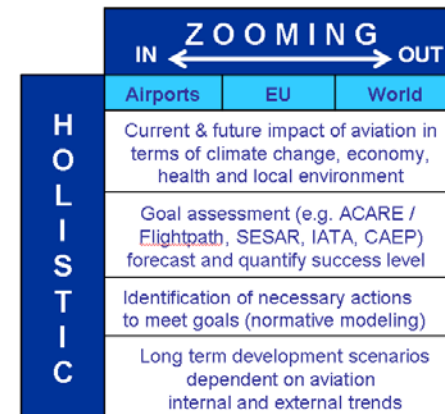
Wide range of aviation-related policy assessment modelling capabilities in Europe, like noise emissions, LAQ, climate impact and economic assessment tools.

## TEAM\_Play Idea:

Combination of this large expertise in order to reach a new level of interdependency modelling capabilities, allowing us to answer more complex questions regarding ecological and economic impacts of air transport and related policy measures.

## Aims:

- Support of European CAEP activities in addition to the already existing US tool suite
- Development of a common infrastructure open to the individual models, and of a Data Warehouse in which (preferably) all data is stored.





# TEAM\_Play – at a glance

- Collaborative project co-funded by the European Commission (about 3.6 M€)
- Duration: 12 / 2010 – 03 / 2013
- Contribution of 18 European partners



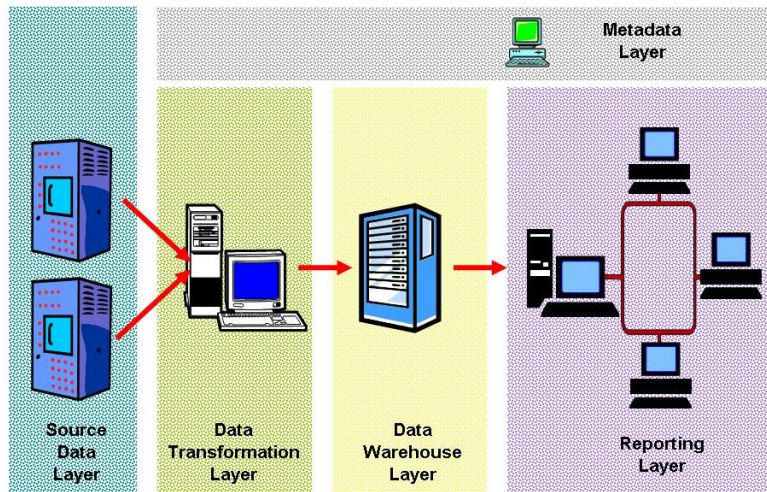
# TEAM\_Play products (1/2)

## WP 1

### “Data Exchange Platform and Harmonised Database”

Lead: ENVISA

Data Warehouse and Data Exchange System



## Achieved objectives:

- Common interfaces and central (open source CMS-based) data warehouse ([www.tpdw.eu](http://www.tpdw.eu))
- Harmonization of assumptions and underlying databases
- Single source of common data for all tools
- Design rules for different models' inputs and outputs (Data Format Guidelines for the harmonisation of input and output data / CSV files)
- Agreed system of data preparation, distribution, collection and post-processing





# TEAM\_Play products (2/2) (Tool Suite)

WP 2

“Tool Suite”

Lead: NLR

Task 2.1  
**Basic Modelling  
System**

Task 2.2  
**Responsive  
Modelling  
System**

Task 2.3  
**Technology  
Response Tool**

Task 2.4  
**Economic  
Models  
Interface**

Task 2.5  
**Environmental  
Models  
Interface**

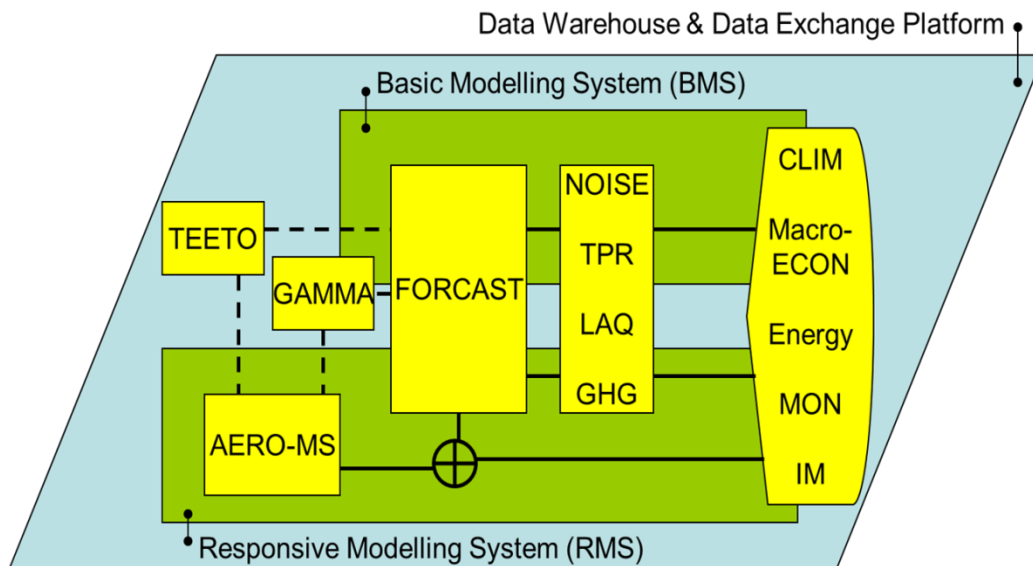
Task 2.6  
**Macroeconomic  
& Monetisation  
Tools**

## Achieved objectives:

- Integration & combination of existing models into the design & development of modelling systems
- Development & validation of an effective and efficiently working Tool Suite for environmental and economic aviation modelling
- Enhancement of existing models and development of an energy module



# TEAM\_Play Tool Suite (continued)



## Achieved objectives:

- Validated versions of both the Basic and Responsive Modelling Systems
- Technology Response Tool prototype
- Working and tested interfaces to environmental (Noise, GHG, Climate response, LAQ) and third party risk (TPR) tools
- Working link to macro-economic analysis models and energy module

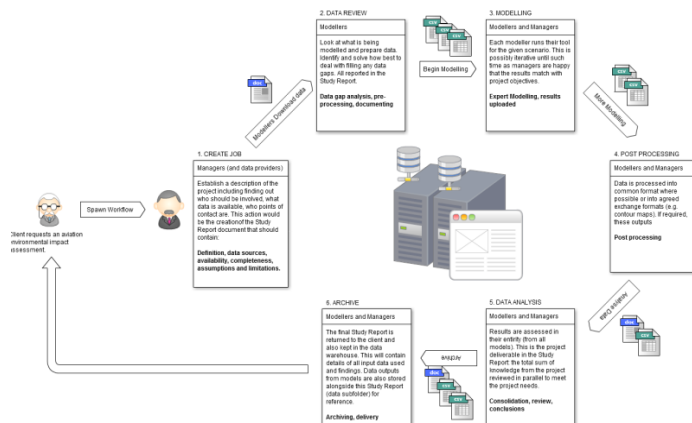


# TEAM\_Play results (1/3)

WP 3

“Assessment Studies”

Lead: FOI



## Achieved objectives:

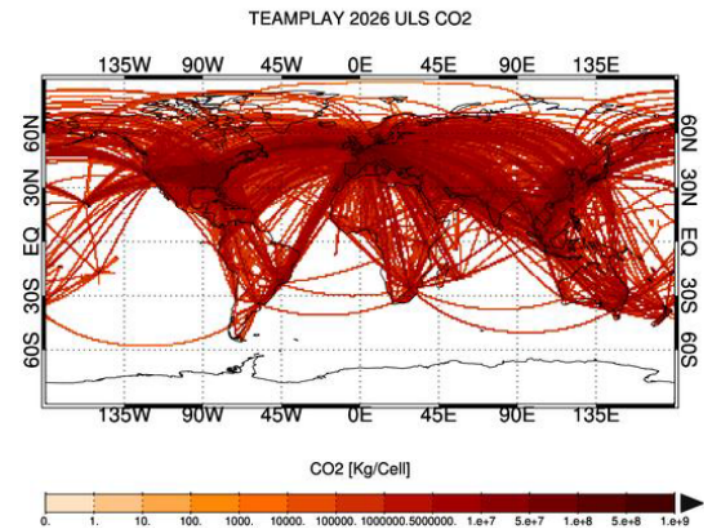
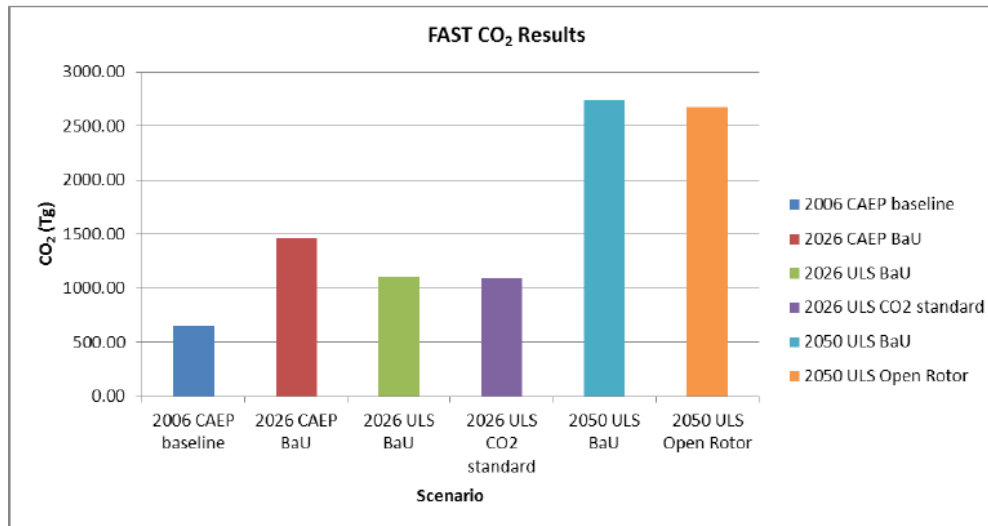
- Proof of the interoperability of the models, and of the connectivity of the models to the data warehouse
- Definition of realistic policy measures and reference scenarios:
  - CONSAVE ULS, 2026 and 2050
  - CO2 standard, open rotor, biofuel (BMS)
  - ticket tax, CO2 standard, long-term ETS, biofuel, eco-routing (RMS)
- Demonstration of the applicability of the European Tool Suite to these use cases (policy measures)



# TEAM\_Play results (2/3)

**ONLY FOR DEMONSTRATION:**

Example results of FAST global GHG emission tool run - CO<sub>2</sub> data

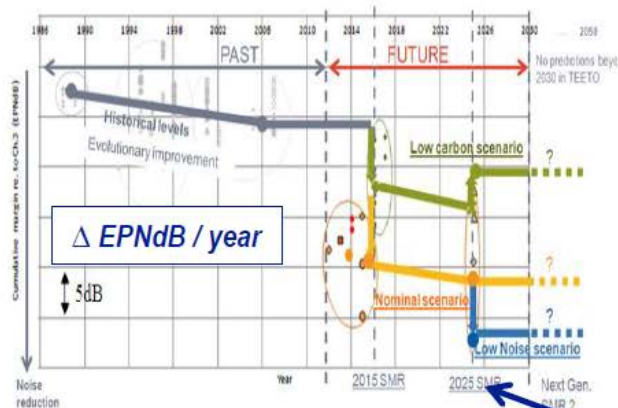




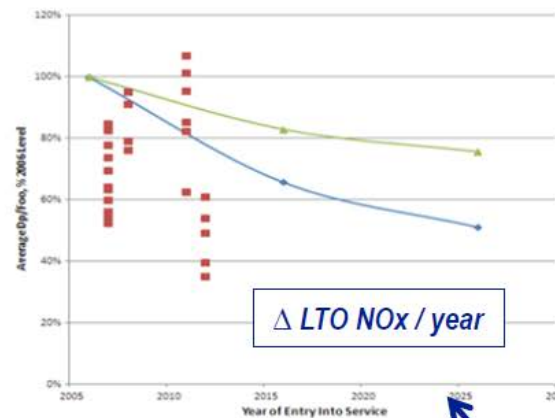
# TEAM\_Play results (3/3)

**ONLY FOR DEMONSTRATION: TEETO noise / NOx / fuel burn improvement trends**

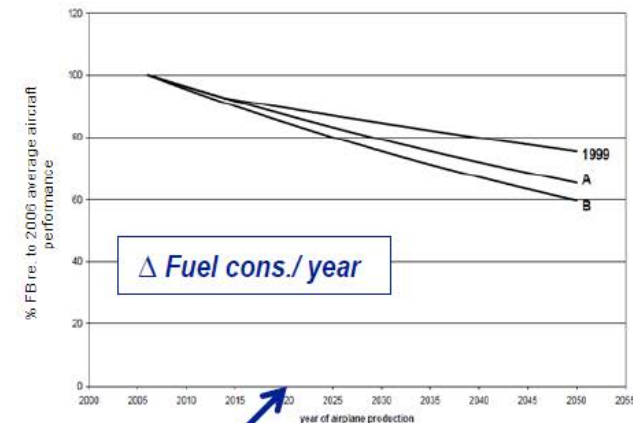
Noise improvement trends



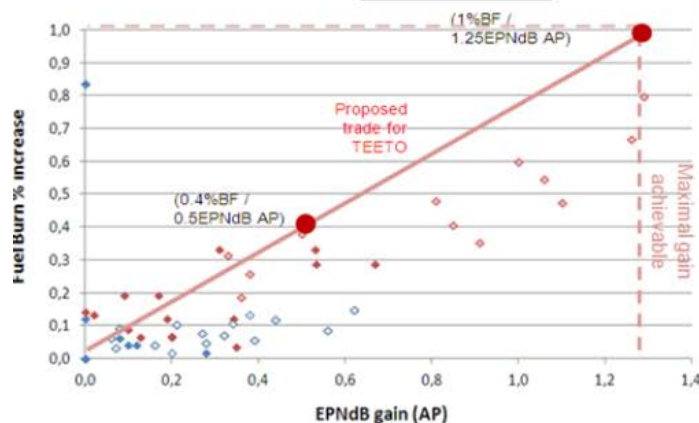
NOx emission improvement trends



Fuel Burn improvement trends



SMR - Trades Noise (AP) / FB



**Noise / NOx / Fuel Burn improvement trends defined for « nominal », « low noise » or « low carbon » scenarios...**

**Noise benefit / Fuel Burn cost (trade-off) due to the integration of Noise Reduction Technologies**



# TEAM\_Play dissemination and outreach

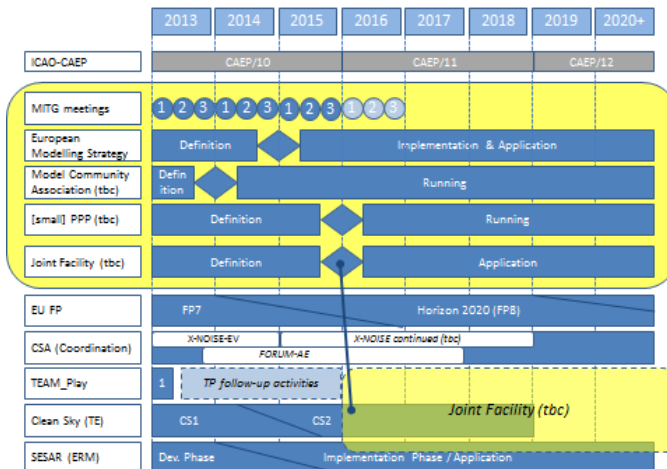
WP 4/5/6

“Durable Implementation”

“Dissemination”

“Project Management”

Lead: DLR/NLR



Proposed European Aviation Modelling Roadmap

## Achieved objectives:

- Design of durable structures for future operational management and coordination for the use, maintenance and enhancement of the TEAM\_Play Tools Suite capabilities
- TP achievements and concepts for durable implementation discussed with Advisory Committee / User Group
- Management and updating of provisions on use, access, intellectual property and ownership of the TEAM\_Play Tools Suite
- Development of business plan for sound future applications of the toolset



# Outlook

[www.teamplay-project.eu](http://www.teamplay-project.eu)

- TEAM\_Play for Europe:
  - Large community of experts in the field
  - Many modelling capabilities existing and workflow established, open for new models such as for connectivity (Flightpath 2050 goal)
  - Data warehouse, data exchange platform and data format guidelines defined

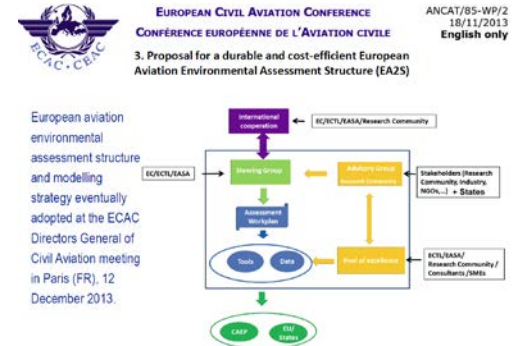
All there to support the European community, and being available for aviation environmental impact assessments and policy support!

## Thank you ... but hold on for a moment!



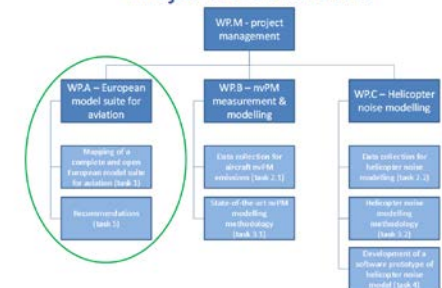
# European aviation environmental modelling strategy (1/2)

- European aviation environmental modelling strategy adopted at ECAC Directors General of Civil Aviation meeting in Paris, 12 DEC 2013, and to be further implemented, mainly through the Modelling Interdependencies Task Group (MITG) of ANCAT (ECAC)
- New, NLR-led EC **DG MOVE** service contract and study shall provide further momentum to establishing a (public) European environmental model suite for aviation.



Service contract No. MOVE/C2/SER/2014-269/SI2.706115

## Project Breakdown



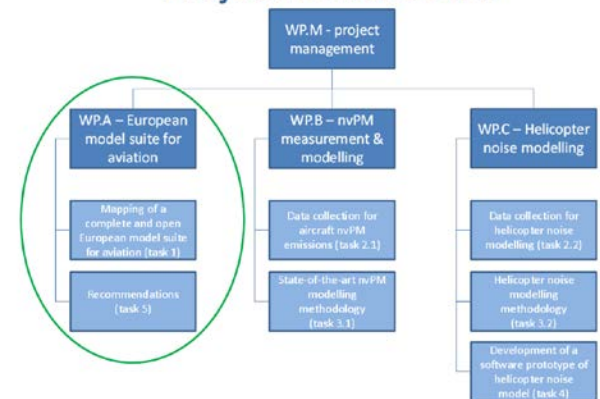


# European aviation environmental modelling strategy (2/2)

- New, NLR-led EC DG MOVE service contract and study shall provide further momentum to establishing a (public) European environmental model suite for aviation.
- Task 1:
  - Assessment of European aviation environmental modelling capability versus requirements of EU policies and regulations
  - Model and data inventory, incl. mapping of links, interfaces and central databases
  - Gaps that should be filled, modelling requirements
- Task 5:
  - Recommendations concerning content development, governance, funding, management and maintenance of tools and data, and their application in a European tool suite
  - Roadmap for delivery of an open European environmental model suite for aviation.

Service contract No. MOVE/C2/SER/2014-269/SI2.706115

## Project Breakdown



Thank you!